

Amendments to the Specification

Kindly replace the original specification and abstract with the enclosed substitute specification and abstract.



PCT/JP00/06827

DESCRIPTION

Portable Computer Device With Detachable Loudspeaker Unit

5

TECHNICAL FIELD

The present invention relates to a portable computer device including a notebook-sized personal computer.

BACKGROUND ART

10 A conventional portable computer device will be explained with reference to the perspective view shown in Fig. 3.

In Fig. 3, the portable computer device includes keyboard-equipped computer main unit 1, foldable display 2 made of a liquid crystal display (LCD), and loudspeaker units 5 disposed in space 6 in main unit 1.

15 Recently, portable computer devices have been getting smaller, lighter, and more powerful. The portable computer is not only used as a portable device, but is also convenient for indoor use, due to its small footprint, instead of a desktop computer. The fact has driven up the demand for portable computer devices.

20 However, such a portable computer, for example, completely relies on small loudspeaker units 5 for its sound response, so that reproduction of low-audio frequencies is not at a satisfactory level. Therefore, in order to improve sound-response characteristics to a sufficient degree, a loudspeaker device with a built-in amplifier, which is similar to one employed for a desktop
25 computer, is required to connect with the portable computer device.

As described in the example above, the portable computer device needs to have another device connected therewith, such as peripheral devices employed

for desktops, for its versatility. The fact inconveniently tends to impair the merit of the portable computer, that is, being compact.

DISCLOSURE OF THE INVENTION

5 The object of the present invention is to provide a portable computer device, making the most of its advantages, i.e., compact size and high performance.

 The portable computer device of the present invention includes:

 a display;

10 a computer main unit having a mounting section therein including a space, the mounting section being provided with a first terminal section and a locking mechanism; and

 another device, which includes a second terminal section for connecting with the first terminal section to exchange signals with the
15 computer main unit, detachably lockable in the mounting section by the locking mechanism.

 This other device is preferably a loudspeaker unit and its terminal section is connectable with the first terminal section for exchanging power and sound information signals with the computer main unit.

20 Yet another device normally required for mobile-use, such as a rechargeable battery, is preferably provided to be exchangeably inserted in a mounting section of the computer main unit. With this structure, the portable computer device satisfactorily delivers its advantage, i.e., being small and lightweight without impairment of the capability, regardless of whether in
25 mobile-use or indoor-use.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view illustrating a notebook-sized personal computer and a detachable another device that are shown in an embodiment of the present invention.

5 Fig. 2 is a perspective view illustrating a personal computer and a plurality of detachable another devices that are shown in another embodiment.

Fig. 3 is a perspective view illustrating a notebook-sized personal computer as a type of prior art portable computers.

10 DETAILED DESCRIPTION OF THE PREFERED EMBODIMENTS

First preferred embodiment

Hereinafter, the portable computer device of the first embodiment of the present invention will be described with reference to the perspective view of the notebook-sized personal computer in Fig. 1, wherein the same parts are
15 identified by the same reference numerals as ones in the notebook-sized personal computer in Fig.3, which is a type of conventional portable computer device.

In Fig. 1, the portable computer device contains keyboard-equipped computer main unit 1a, foldable display 2 made of a liquid crystal display (LCD), and loudspeaker units 5 disposed in space 6 in main unit 1a.
20

Computer main unit 1a further comprises first mounting section 3a and second mounting section 3b.

The first mounting section 3a includes first terminal section 3d1 for exchanging information with power supply and computer main unit 1a, and a
25 locking section that detachably locks another device. For the locking section, a known locking mechanism, for example, press-fitting is employed (not shown.) First mounting section 3a includes a space. The space is formed so that an I/O

device including a floppy disk drive (not shown), and a rechargeable battery are installed in first mounting section 3a. Such an installed device has another terminal section (not shown), which exchanges information with power supply or computer main unit 1a by connecting with terminal section 3d1.

5 Second mounting section 3b includes second terminal section 3d2 for exchanging power supply with computer main unit 1a, and a locking section for detachably locking another device. The locking section (not shown) is formed in the same way as that of first mounting section 3a. Second mounting section 3b also has a space therein. The space is for accepting another device (not
10 shown) having a another terminal section (not shown), which exchanges information with power supply and computer main unit 1a by connecting with second terminal section 3d2.

Loudspeaker device 4, which is described as another device, contains an amplifier therein and port 4a for reproducing low audio frequencies. As shown
15 in Fig. 1, when the loudspeaker device 4 is installed in the mounting section 3c, the port 4a opens to an exterior of the computer main unit 1b.

Loudspeaker device 4 is detachably installed in first mounting section 3a or second mounting section 3b. Through second terminal section 4b, loudspeaker device 4 is provided with power supply and sound information from
20 computer main unit 1a.

When installed in first mounting section 3a or second mounting section 3b of computer main unit 1a, loudspeaker device 4 is activated by connecting second terminal section 4b with first terminal section 3d1 or second terminal section 3d2 and thereby receiving power supply and sound information from
25 computer main unit 1a.

In the embodiment, loudspeaker units 5 are installed in computer main unit 1a. Therefore, loudspeaker device 4 may be used for reproducing a

low-pitched sound that cannot be covered by loudspeaker units 5.

Loudspeaker device 4 also may be used as a full-range speaker in such a way that loudspeaker units 5 do not work while loudspeaker device 4 is installed in computer main unit 1a.

5 Besides, although loudspeaker device 4 has been described as having a built-in amplifier in the explanation above, a loudspeaker having no amplifier may be acceptable if an adequately large output of sound information is provided from computer main unit 1a.

Although loudspeaker device 4 is described as a detachable device in the
10 embodiment, the detachable device is not limited to loudspeaker device 4. A battery or a hard disk device may also be a detachable device. Without increasing the bulk of the body, the portable computer can exert its functions regardless of whether in mobile-use or table top-use, by installing the appropriate detachable device selected from such devices as required.

15

Second Preferred Embodiment

Fig. 2 illustrates a notebook-sized personal computer in another embodiment of the present invention, wherein the same parts are identified by the same reference numerals as ones described in the first preferred
20 embodiment. In Fig. 2, the portable computer device comprises keyboard-equipped computer main unit 1b, foldable display 2 made of an LCD, and loudspeaker units 5 disposed in space 6 in main unit 1b.

Computer main unit 1b has mounting section 3c.

Mounting section 3c includes terminal section 3d for exchanging
25 information with power supply and computer main unit 1b, and a locking section that detachably locks another device. For the locking section, a mechanism similar to that employed for first mounting section 3a in the first

preferred embodiment can be used. Mounting section 3c has a space therein. The space is formed so that I/O device 7 including a floppy disk drive, and a rechargeable battery are installed in mounting section 3c. Such an installed device has another terminal section 7a, which exchanges information with
5 power supply and computer main unit 1b by connecting with terminal section 3d. Loudspeaker device 4 is detachably installed in mounting section 3c. Loudspeaker device 4 is provided with second terminal section 4b for receiving power and sound information from computer main unit 1b.

When carrying the notebook-sized personal computer having such a
10 structure described above, a rechargeable battery (not shown) is installed in mounting section 3c. On the other hand, when the computer is used indoors and so on, i.e., commercial power is available, I/O device 7 such as a floppy disk drive, or loudspeaker device 4 can be installed in mounting section 3c.

In this way, as much expandability as a desktop computer can be realized
15 in the notebook-sized personal computer, taking full advantage of its small sized and lightweight body.

In the figure and explanation of the second embodiment, I/O device 7 and loudspeaker device 4, which are installed in mounting section 3c, have been described as having the similar size as mounting section 3c. However, I/O
20 device 7 and loudspeaker device 4 may be smaller, or bigger than mounting section 3c. Such devices will be acceptable, in such a way that another terminal section to be a counterpart of terminal section 3d is disposed in another device, such as I/O device 7 and loudspeaker device 4, and the device is lockable by the locking section in mounting section 3c.

25 Besides, although loudspeaker device 4 is described as having port 4a in the two embodiments, other systems, such as a sealed speaker enclosure type system, a band-pass-box type system, an acoustic labyrinth type system, and a

horn type system, are also acceptable.

INDUSTRIAL APPLICABILITY

As described above, the portable computer device of the present invention
5 comprises a terminal section for exchanging signals with the computer main
unit, a locking section for detachably locking another device in the computer
main unit, and a mounting section having a space formed in the computer main
unit. Another device is detachably installed in the mounting section, so that
the device required for mobile-use and the device required for indoor-use can be
10 installed in the space in the mounting section, replacing each other as required.
Regardless of indoor-use or outdoor-use, the portable computer device
satisfactorily delivers its advantage, i.e., being small and lightweight without
impairment of its performance.

In addition, in the case that a loudspeaker unit having an acoustic space
15 is installed as another device, the portable computer, when used indoors,
employs the loudspeaker unit. Without an external add-on loudspeaker unit
for reproducing low audio frequencies, and without being bulky inconveniently
for portables, the computer can reproduce low-pitched sound and obtain sound
response having high quality acoustic characteristics.

20 Furthermore, in the case that a loudspeaker unit having an acoustic
space and an amplifier is installed as another device above, when used indoors,
without an external add-on loudspeaker unit for reproducing low audio
frequencies, the computer can reproduce low-pitched sound and obtain sound
response having high quality acoustic characteristics, though it is a portable
25 computer.

Besides, in the case that a power supply terminal, which supplies power
to another device or connects a rechargeable battery, is disposed at the

mounting section of the computer main unit, the computer can accept devices requiring power supply connections such as devices reading or writing information, a rechargeable battery, a floppy disk drive, and a CD-ROM drive. The portable computer thus can make the most of its expandability, taking full
5 advantage of its small sized and lightweight body.

Likewise, in the case that a plurality of terminals are disposed at the mounting section of the computer main unit so that power supply can be delivered between the plural terminals and a rechargeable battery having a relatively large volume, the mounting section can detachably accept a
10 loudspeaker unit, which has an acoustic space and a built-in amplifier, and another terminal that receives power and sound information from the computer main unit by connecting with the terminal section of the computer main unit.

In this case, the mounting section for the rechargeable battery with a relatively large volume is used for the loudspeaker unit. Such an installation
15 can realize the sound output with the frequency response, which is greatly improved in reproducing low-audio frequencies.

Abstract

A portable computer device that realizes its versatility, without impairment of its advantages, i.e., being small, lightweight and powerful. The portable computer device comprises terminal sections (3d1, 3d2) exchanging
5 signals with computer main unit (1a), a locking section for locking another device to be installed, and mounting sections (3a, 3b) made of a space that accommodates the terminal sections and the locking section therein. According to the portable computer device, devices required for mobile-use and for table top-use can be exchangeably installed in the space. Therefore, the
10 portable computer device exerts a greater expandability without impairment of its advantage.